



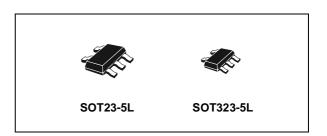
# SINGLE BUS BUFFER (3-STATE)

- HIGH SPEED:  $t_{PD} = 3.8$ ns (TYP.) at  $V_{CC} = 5$ V
- LOW POWER DISSIPATION:  $I_{CC} = 1\mu A \text{ (MAX.)}$  at  $T_A = 25^{\circ}\text{C}$
- HIGH NOISE IMMUNITY: V<sub>NIH</sub> = V<sub>NIL</sub> = 28% V<sub>CC</sub> (MIN.)
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE: |I<sub>OH</sub>| = I<sub>OL</sub> = 8mA (MIN) at V<sub>CC</sub> = 4.5V
- BALANCED PROPAGATION DELAYS: t<sub>PLH</sub> ≅ t<sub>PHL</sub>
- OPERATING VOLTAGE RANGE: V<sub>CC</sub>(OPR) = 2V to 5.5V
- IMPROVED LATCH-UP IMMUNITY



The 74V1G125 is an advanced high-speed CMOS SINGLE BUS BUFFER fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

3-STATE control input  $\overline{G}$  has to be set HIGH to place the output into the high impedance state.

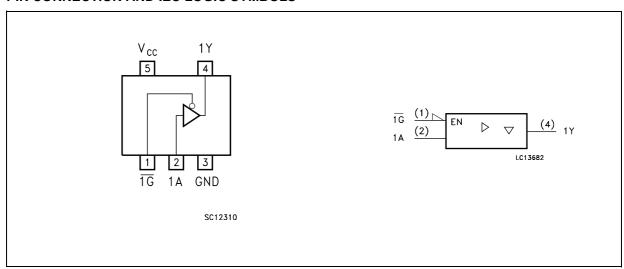


#### **ORDER CODES**

PACKAGE	T & R
SOT23-5L	74V1G125STR
SOT323-5L	74V1G125CTR

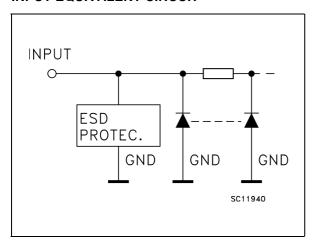
Power down protection is provided on all inputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 5V to 3V.

#### PIN CONNECTION AND IEC LOGIC SYMBOLS



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### **INPUT EQUIVALENT CIRCUIT**



### **PIN DESCRIPTION**

PIN N°	SYMBOL	NAME AND FUNCTION
1	1G	Output Enable Input
2	1A	Data Input
4	1Y	Data Output
3	GND	Ground (0V)
5	V <sub>CC</sub>	Positive Supply Voltage

### **TRUTH TABLE**

Α	G	Y
Х	Н	Z
L	L	L
Н	L	Н

X : Don't Care Z : High Impedance

#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +7.0	V
V <sub>I</sub>	DC Input Voltage	-0.5 to +7.0	V
V <sub>O</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current	- 20	mA
I <sub>OK</sub>	DC Output Diode Current	± 20	mA
I <sub>O</sub>	DC Output Current	± 25	mA
I <sub>CC</sub> or I <sub>GND</sub>	DC V <sub>CC</sub> or Ground Current	± 50	mA
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
$T_L$	Lead Temperature (10 sec)	260	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

### **RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	2 to 5.5	V
VI	Input Voltage	0 to 5.5	V
V <sub>O</sub>	Output Voltage	0 to V <sub>CC</sub>	V
T <sub>op</sub>	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time (note 1) ( $V_{CC}$ = 3.3 $\pm$ 0.3V) ( $V_{CC}$ = 5.0 $\pm$ 0.5V)	0 to 100 0 to 20	ns/V ns/V

1) V<sub>IN</sub> from 30% to 70% of V<sub>CC</sub>

### **DC SPECIFICATIONS**

		1	est Condition				Value				
Symbol	Parameter	V <sub>CC</sub>		T <sub>A</sub> = 25°C -40 t				85°C	-55 to	125°C	Unit
		(V)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
V <sub>IH</sub>	High Level Input	2.0		1.5			1.5		1.5		
	Voltage	3.0 to 5.5		0.7V <sub>CC</sub>			0.7V <sub>CC</sub>		0.7V <sub>CC</sub>		V
$V_{IL}$	Low Level Input	2.0				0.5		0.5		0.5	
	Voltage	3.0 to 5.5				0.3V <sub>CC</sub>		0.3V <sub>CC</sub>		0.3V <sub>CC</sub>	V
V <sub>OH</sub>	High Level Output	2.0	I <sub>O</sub> =-50 μA	1.9	2.0		1.9		1.9		
	Voltage	3.0	I <sub>O</sub> =-50 μA	2.9	3.0		2.9		2.9		
		4.5	I <sub>O</sub> =-50 μA	4.4	4.5		4.4		4.4		V
		3.0	I <sub>O</sub> =-4 mA	2.58			2.48		2.4		
		4.5	I <sub>O</sub> =-8 mA	3.94			3.8		3.7		
V <sub>OL</sub>	Low Level Output	2.0	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	
	Voltage	3.0	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	
		4.5	I <sub>O</sub> =50 μA		0.0	0.1		0.1		0.1	V
		3.0	I <sub>O</sub> =4 mA			0.36		0.44		0.55	
		4.5	I <sub>O</sub> =8 mA			0.36		0.44		0.55	
I <sub>OZ</sub>	High Impedance Output Leakage Current	5.5	$V_I = V_{IH}$ or $V_{IL}$ $V_O = V_{CC}$ or GND			±0.25		± 2.5		± 5	μΑ
I <sub>I</sub>	Input Leakage Current	0 to 5.5	V <sub>I</sub> = 5.5V or GND			± 0.1		± 1		± 1	μΑ
Icc	Quiescent Supply Current	5.5	$V_I = V_{CC}$ or GND			1		10		20	μΑ

# AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3ns$ )

	1	Test Co	ondition	Value								
Symbol Parameter	v <sub>cc</sub>	CL		Т	T <sub>A</sub> = 25°C		-40 to 85°C		-55 to 125°C		Unit	
		(V)	(pF)		Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
t <sub>PLH</sub>	Propagation Delay	3.3 <sup>(*)</sup>	15			5.1	7.5	1.0	8.5	1.0	9.5	
t <sub>PHL</sub>	Time	3.3 <sup>(*)</sup>	50			5.6	8.0	1.0	9.5	1.0	10.5	ns
		5.0 <sup>(**)</sup>	15			3.8	5.5	1.0	6.5	1.0	7.5	115
		5.0 <sup>(**)</sup>	50			4.3	6.5	1.0	7.5	1.0	8.5	
t <sub>PLZ</sub>	Output Disable	3.3 <sup>(*)</sup>	15			5.4	8.0	1.0	9.0	1.0	10.0	
t <sub>PHZ</sub>	Time	3.3 <sup>(*)</sup>	50			7.9	11.5	1.0	12.5	1.0	13.5	ns
		5.0 <sup>(**)</sup>	15			3.6	5.0	1.0	6.0	1.0	7.0	115
		5.0(**)	50			5.1	7.0	1.0	8.0	1.0	9.0	
		3.3 <sup>(*)</sup>	15			5.4	7.6	1.0	9.5	1.0	10.5	
t <sub>PZL</sub>	Output Enable	3.3 <sup>(*)</sup>	50			5.9	8.5	1.0	10.0	1.0	11.0	ne
t <sub>PZH</sub>	Time	5.0 <sup>(**)</sup>	15			3.7	5.9	1.0	7.0	1.0	8.0	ns
		5.0 <sup>(**)</sup>	50			4.1	6.5	1.0	7.5	1.0	8.5	

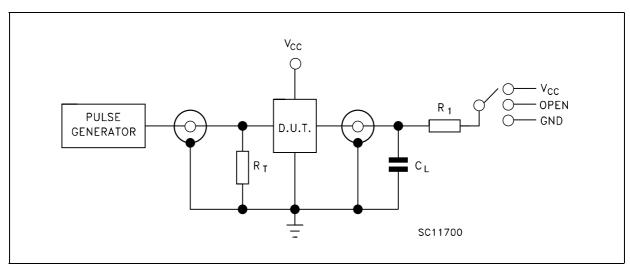
<sup>(\*)</sup> Voltage range is 3.3V ± 0.3V (\*\*) Voltage range is 5.0V ± 0.5V

### **CAPACITIVE CHARACTERISTICS**

		Test Condition	Test Condition Value							
Symbol	Parameter		Т	A = 25°	С	-40 to	85°C	-55 to	125°C	Unit
			Min.	Тур.	Max.	Min.	Max.	Min.	Max.	
C <sub>IN</sub>	Input Capacitance			4	10		10		10	pF
C <sub>OUT</sub>	Output Capacitance			4						pF
C <sub>PD</sub>	Power Dissipation Capacitance (note 1)			10						pF

<sup>1)</sup> C<sub>PD</sub> is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I<sub>CC(opr)</sub> = C<sub>PD</sub> x V<sub>CC</sub> x f<sub>IN</sub> + I<sub>CC</sub>

#### **TEST CIRCUIT**

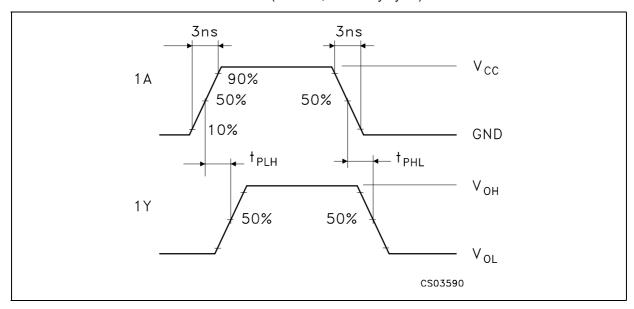


TEST	SWITCH
t <sub>PLH</sub> , t <sub>PHL</sub>	Open
t <sub>PZL</sub> , t <sub>PLZ</sub>	V <sub>CC</sub>
t <sub>PZH</sub> , t <sub>PHZ</sub>	GND

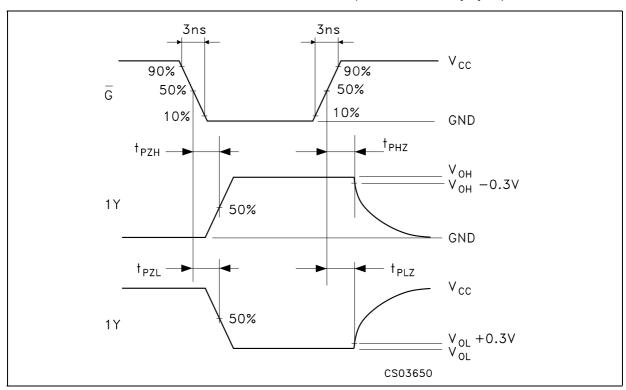
 $C_L$  =15/50pF or equivalent (includes jig and probe capacitance) R1 = 1K $\Omega$  or equivalent R<sub>T</sub> = Z<sub>OUT</sub> of pulse generator (typically 50 $\Omega$ )

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### WAVEFORM 1: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)

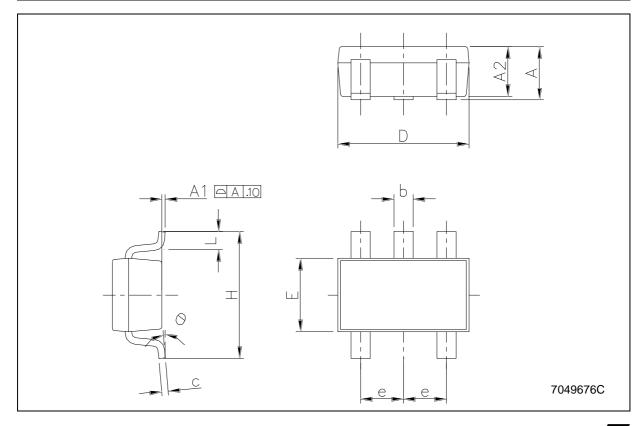


### WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME (f=1MHz; 50% duty cycle)



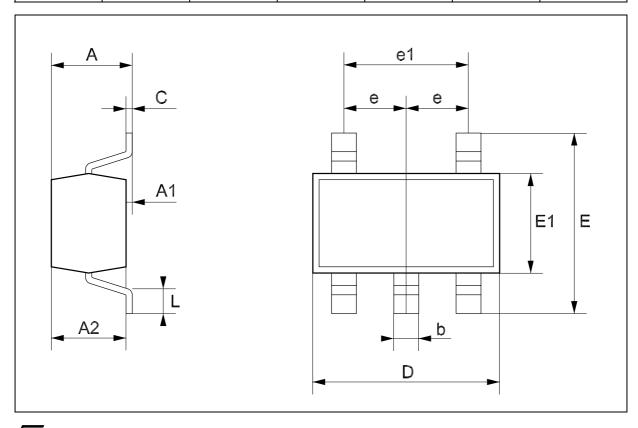
## **SOT23-5L MECHANICAL DATA**

DIM.		mm.			mils		
DIWI.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.	
А	0.90		1.45	35.4		57.1	
A1	0.00		0.10	0.0		3.9	
A2	0.90		1.30	35.4		51.2	
b	0.35		0.50	13.7		19.7	
С	0.09		0.20	3.5		7.8	
D	2.80		3.00	110.2		118.1	
E	1.50		1.75	59.0		68.8	
е		0.95			37.4		
Н	2.60		3.00	102.3		118.1	
L	0.10		0.60	3.9		23.6	



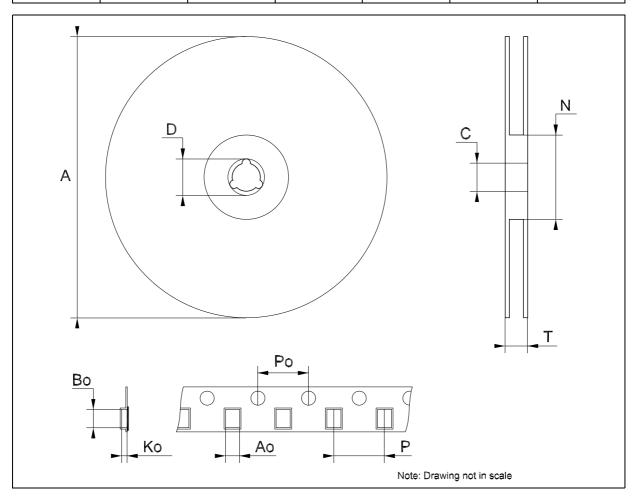
## **SOT323-5L MECHANICAL DATA**

DIM		mm.			mils			
DIM.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.		
А	0.80		1.10	31.5		43.3		
A1	0.00		0.10	0.0		3.9		
A2	0.80		1.00	31.5		39.4		
b	0.15		0.30	5.9		11.8		
С	0.10		0.18	3.9		7.1		
D	1.80		2.20	70.9		86.6		
E	1.80		2.40	70.9		94.5		
E1	1.15		1.35	45.3		53.1		
е		0 .65			25.6			
e1		1.3			51.2			
L	0.10		0.30	3.9		11.8		

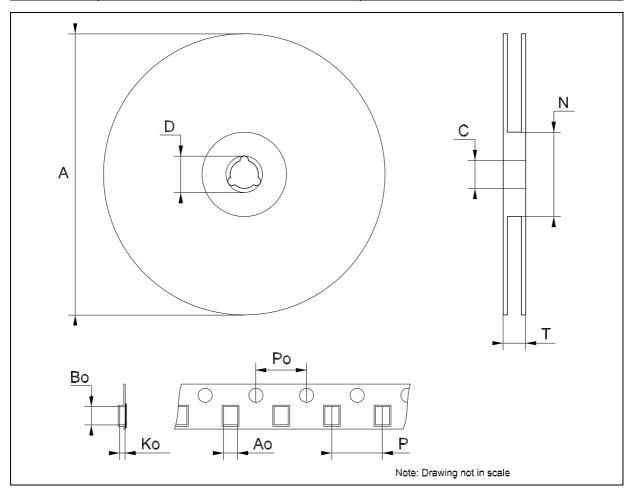


# Tape & Reel SOT23-xL MECHANICAL DATA

DIM		mm.			inch	
DIM.	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
Α			180			7.086
С	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
Т			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Во	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58
Po	3.9	4.0	4.1	0.153	0.157	0.161
Р	3.9	4.0	4.1	0.153	0.157	0.161



DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
А	175	180	185	6.889	7.086	7.283
С	12.8	13	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	59.5	60	60.5		2.362	
Т			14.4			0.567
Ao		2.25			0.088	
Во		2.7			0.106	
Ko		1.2			0.047	
Ро	3.9	4	4.1	0.153	0.157	0.161
Р	3.8	4	4.2	0.149	0.157	0.165



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